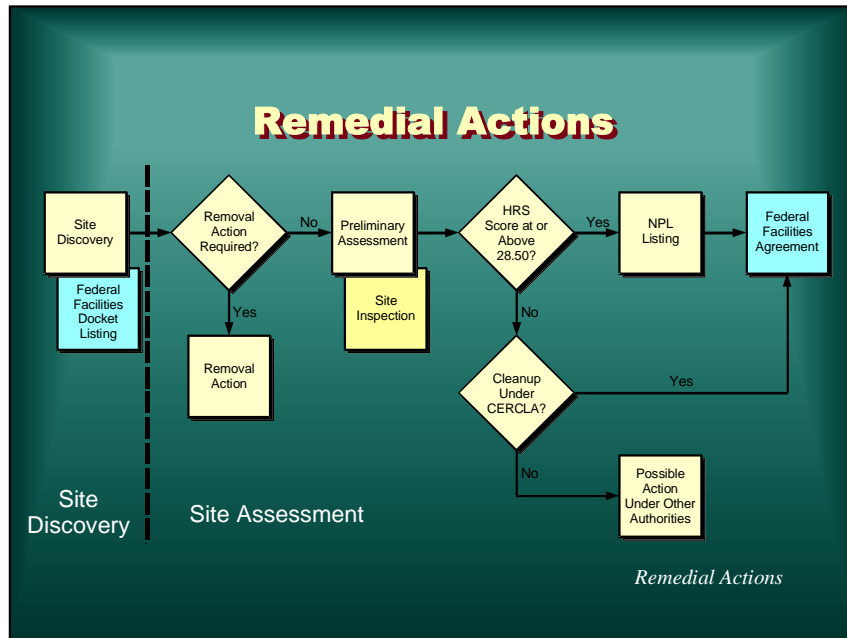


### **XIII. Remedial Actions and the ARARs Process**

**Notes:**



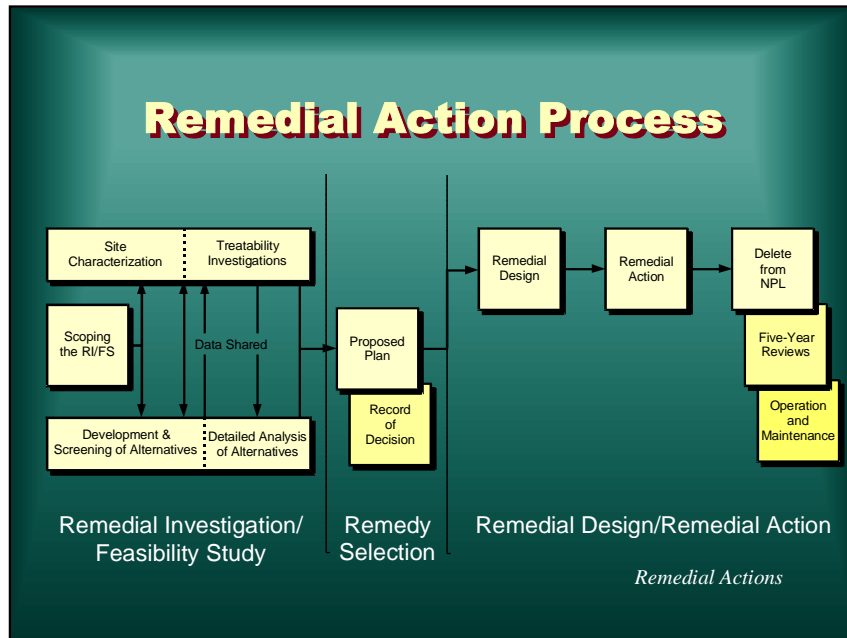
## Notes:

**Site discovery** is the first phase of the CERCLA remedial process and occurs through various means including reports to EPA of releases, government investigations, land inventories or surveys, or incidental discoveries.

**Site assessment**, the second phase is outlined in the NCP at 40 CFR §300.420 and has investigative aspects similar to the RCRA Corrective Action process. First DOE conducts a remedial PA, a “desktop” review of available site information, that includes collection of demographic information and physical site characteristics. Sites not posing sufficient threat to human health or the environment to warrant CERCLA response are screened out. The next step, the remedial site inspection (SI), may be required to further evaluate site conditions. This is a more detailed investigation of site conditions and usually involves sampling of environmental media. Information gathered from the remedial PA/SI is the basis for the third step—scoring the site using the HRS (40 CFR §300.425), a model for assessing the site’s relative threat to human health and the environment.

If a site scores at or above 28.50, it may be placed on the NPL, and a RI/FS is required. For sites not listed on the NPL, DOE’s policy is to remediate contaminated sites using the CERCLA process or, when appropriate, another authority such as RCRA. Within six months of NPL listing, DOE policy requires that the facility enter into a FFA or IAG with EPA and the state to establish the requirements for conducting the RI/FS.

Note that EPA regulators (or state regulators under a state-authorized program) have the authority to mandate possible cleanup actions under other regulatory authorities (eg., RCRA, CWA) outside of the CERCLA process.



## Notes:

**Remedial Investigation/Feasibility Study.** The third phase of the remedial process is an RI/FS (40 CFR §300.430), a process that characterizes the site and evaluates various alternatives for cleanup. The RI is the collection of sufficient, detailed information to characterize site conditions, the nature and extent of the contamination, evaluate the risks posed by the site, assess the performance of options for remediation, and make an informed risk management decision. The FS involves development, screening, and detailed evaluation of each remedial option. The RI and the FS are often conducted concurrently, and in an iterative fashion. Treatability studies can be done during the FS stage as part of the development and screening of alternatives, and must comply with ARARs to the extent practicable. Removal actions and interim measure actions can be conducted **at any time** during the remedial process. Conclusion of the RI/FS leads to the selection of the remedial option, the development of the proposed plan, and the signing of the Record of Decision (ROD). Once the ROD is signed, the RI/FS has been completed.

Once the ROD, which includes the agreed-upon ARARs and any necessary ARAR waivers, is signed, the ARARs are “frozen,” all subsequent actions/documents in the remedial process need to comply with and reference the ARARs as identified in the ROD.

**Remedial Design/Remedial Action.** The final phase of the CERCLA remedial action process is the RD/RA where the selected remedy is implemented (40 CFR §400.435). The RD involves all aspects of designing the remedial action, including development of technical drawings, specifications, operational guidance, and training. The RA involves construction, operation, and monitoring of the remedial action selected for cleanup. Depending on site conditions, an RA may continue for many years. Upon completion of the RA and demonstration that the site has been remediated to required cleanup levels, the site may then be deleted from the NPL.

## **Purpose of RI/FS Process**

- Used to characterize extent, nature, risk, & cleanup alternatives of hazardous substance releases
- Leads to informed risk management decision regarding cleanup

*Remedial Actions*

### **Notes:**

The RI/FS process is the methodology used to characterize the extent and nature of contamination, the risks from that contamination, and the alternatives for cleanup of releases of the hazardous substances.

The RI/FS process leads to an **informed risk management decision** regarding the cleanup of any contamination at the site.

## **Scoping/Planning RI/FS**

- Review existing information
- Establish remedial objectives
- Determine remedial options
- Assess need for treatability studies
- Identify preliminary ARARs
- Prepare RI/FS work plan & support documents

*Remedial Actions*

**Notes:**

## **Scoping the RI/FS: Documents**

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Required:

- RI/FS work plan (RI/FS WP)
- Sampling and analysis plan (SAP)
- Health and safety plan (HASP)
- Community relations plan (CRP)

Recommended:

- Data management plan (DMP)

*Remedial Actions*

**Notes:**

## **ARARs Support for the Scoping Documents**

- RI/FS WP: may include preliminary chemical- & location-ARARs for known COCs
- SAP: compare detection limits to chemical-specific ARARs to ensure limits are low enough
- HASP: includes OSHA requirements, which are not ARARs
- CRP & DMP: none

*Remedial Actions*

### **Notes:**

If there is an extensive amount of information already available about the site, including historical information about contamination at the site, the RI/FS work plan can, but is not required to, include a listing of chemical-specific ARARs for the known contaminants at the site, to assist in the preliminary evaluation of the site and future investigative planning. Likewise, preliminary location-specific ARARs can be identified for known site conditions and sensitive resources to guide preliminary evaluation and scoping of alternatives.

## **Conducting the RI/FS: Site Characterization**

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- Investigate physical characteristics
- Define sources of contamination
- Determine nature/extent of contamination
- Analyze contaminant fate & transport

*Remedial Actions*

**Notes:**

## Conducting the RI/FS: Site Characterization (cont'd)

- Using characterization data, conduct baseline risk assessment
- Develop preliminary remedial goals (PRGs), based on the risk assessment data and chemical-specific ARARs
- Develop documentation of chemical- and location-specific ARARs

*Remedial Actions*

### Notes:

Once all the site characterization data is collected and analyzed, preliminary remedial goals (PRGs) are established for each COC in each medium. These numbers are usually based on the chemical-specific ARAR for the contaminant, if available, or the number which results in a risk level in the range of  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$  for carcinogens or a hazard quotient  $<1$  for non-carcinogens. A PRG is a risk-based value that serves as the point of departure for the establishment of site-specific cleanup levels. PRGs are often modified to become final cleanup levels based on a consideration of the nine-criteria analysis described in the NCP.

In December 1994, EPA published “soil screening levels” (SSLs) and a soil screening framework that includes a methodology for calculating site-specific SSLs using site data with standardized equations (*Soil Screening Guidance*, EPA/540/R-94/101, OSWER 9355.4-14FS, December 1994). Areas with soil contaminant concentrations below SSLs generally would not warrant further study or action under CERCLA. EPA states that these SSLs may serve as PRGs where the basis for response action exists at a site and all exposure pathways of concern are addressed by the SSLs. Providing the RI team with this methodology and SSL levels to assist development of PRGs is an example of the kind of support the ARARs team can provide during the RI site characterization phase.

The preliminary site characterization data is used by the lead or support agency to develop chemical- and location-specific ARARs for the RI Report. The list of preliminary chemical-specific ARARs developed for the sampling and analysis effort is refined to include new COCs identified during the site characterization effort. In addition, the location-specific ARARs are expanded to include those addressing any new physical characteristics identified during the site characterization effort (e.g., wetlands, historic sites).

## The RI Report

- No specific format required by EPA
- FFA or IAG may specify format and/or information to be included
- Documents all findings of site characterization and baseline risk assessment
- Includes preliminary listing of chemical- and location-specific ARARs

*Remedial Actions*

### Notes:

The RI is a collection of sufficient detailed information to characterize site conditions, determine the nature and extent of the contamination, evaluate risks posed by the site, assess the performance of options for remediation, and make an informed risk management decision.

EPA lists a suggested RI Report format on Table 3-13 of its *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERLCA* (EPA /540/G-89/004, OSWER 9355.3-01, October 1988).

## Information Required for Developing Chemical-Specific ARARs

- Environmental media that will be undergoing remediation
- COCs in each medium, and maximum levels detected
- Type of waste:
  - ⇒ RCRA-characteristic or -listed?
  - ⇒ PCBs?
  - ⇒ Radioactive waste?

*Remedial Actions*

**Notes:**

## **Information Needed for Developing Location-Specific ARARs**

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- Locational characteristics
- Fault displaced in Holocene time?
- Wetlands or floodplains?
- Salt-dome formations, underground mines, or caves?
- Historic sites or projects?
- Archaeological findings?
- Wilderness areas, designated wild or scenic rivers?
- Critical habitat, endangered or threatened species?

*Remedial Actions*

**Notes:**

## Sources of Sensitive Resources Information

- Site descriptions in published documents
- NEPA (“sensitive resource”) survey results
- RI investigative team reports
- Personal knowledge
  - ⇒ Environmental monitoring staff
  - ⇒ Site visit
  - ⇒ Scientific community

*Remedial Actions*

### Notes:

NEPA sensitive resource surveys done in support of NEPA values documentation for the CERCLA response action may identify sensitive resources which may be impacted by implementation of an alternative. Location-specific ARARs address those impacted sensitive resources.

## **Conducting the RI/FS: Development & Screening of Alternatives**

- Develop remedial action objectives (RAOs) based on PRGs developed in the RI
- Identify potential treatment technologies, & containment/disposal requirements for untreated waste and residuals
- Screen technologies
- Identify action-specific ARARs
- Assemble technologies into alternatives
- Screen alternatives as necessary

*Remedial Actions*

### **Notes:**

It is very important that the ARARs staff be involved early in the screening of alternatives process to avoid carrying forward alternatives which could not meet identified ARARs or qualify for ARAR waivers.

## Process for Developing Action-Specific ARARs

- Identify all remedial alternatives that may be considered for the site
  - Identify scope of remedial action
  - Determine types of unit on the site
    - ▢ Landfill/surface impoundment/waste pile/UST?
    - ▢ RCRA-permitted? Subtitle C or D?
- Remedial Actions*

**Notes:**

## **Process for Developing Action-Specific ARARs (cont'd)**

- Establish scenarios for each alternative
  - Preconstruction activities (grubbing, backfilling, vegetation removal, roadbuilding)
  - Excavation/removal of soil
  - Impact on adjacent surface water bodies
  - Treatment options
  - Disposal of treated media and/or residuals
  - Closure options

*Remedial Actions*

**Notes:**

### **Suggested Process for Documenting Action-Specific ARARs**

- Develop text/table of ARARs common to *all* alternatives
- Examples:
  - ▢ Fugitive dust emissions
  - ▢ Storm water runoff
- Develop text/tables of additional ARARs *specific* to each alternative

*Remedial Actions*

#### **Notes:**

See Appendices for examples of ARAR documentation in CERCLA remedial actions, as well as examples of documentation for removal actions.

## Conducting the RI/FS: Treatability Studies

- Remedial alternative subjected to bench- and/or pilot-scale testing to assess effectiveness under actual conditions
- Results summarized in TS Report to support the detailed analysis of alternatives
- Treatability studies must comply with ARARs “to the extent practicable”

*Remedial Actions*

### Notes:

See EPA’s *Guide for Conducting Treatability Studies under CERCLA* (EPA/540/R-92/071a, OSWER 9380.3-10, November 1992) for a detailed discussion of treatability studies, including a suggested treatment study report format and a process for analysis and documentation of ARARs for treatability studies.

## **Conducting the RI/FS: Detailed Analysis of Alternatives**

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- Analyze each alternative against nine evaluation criteria
- Compare alternatives against each other
- Using RI and treatability studies findings, determine which alternatives provide greatest benefits while maximizing use of available resources, including funding

*Remedial Actions*

**Notes:**

## **Remedial Alternatives Selection Criteria (CERCLA Sect. 121)**

- Threshold criteria
- Primary balancing criteria
- Modifying criteria

*Remedial Actions*

### **Notes:**

Each alternative is assessed against the nine evaluation criteria found in 40 CFR 300.430(e)(9)(iii); the results of this analysis are then compared with each of the other alternatives. The nine evaluation criteria are based on the CERCLA Section 121 statutory requirements:

- Protect human health and the environment;
- Attain ARARs or provide reasons for not achieving ARARs;
- Be cost effective;
- Utilize permanent solutions, alternative solutions, or resource recovery technologies to the maximum extent possible; and
- Satisfy the preference for treatment that reduces the toxicity, mobility, or volume of the contaminants as opposed to an alternative that provides only for containment.

## Threshold Criteria

- Overall protection of human health and the environment
- Compliance with ARARs

*Remedial Actions*

### Notes:

The two threshold criteria are statutory requirements that the chosen alternative must satisfy. Alternatives that do not meet the threshold criteria are not eligible for selection as the final remedy.

***Overall protection of human health and the environment*** addresses how the alternative provides adequate protection by eliminating, reducing, or controlling risk. The risk assessment done as part of the RI/FS process evaluates the risk at the site which each alternative must address.

***Compliance with ARARs*** addresses how well the alternative complies with ARARs and TBCs and whether waivers can be justified.

Both the risk assessment and the ARARs typically look at each COC individually. The alternatives may need to achieve a level of protection more conservative than the risk assessment or ARARs mandate, however, in order to address the synergistic effect of combined COCs and provide overall protection of human health and the environment.

## Primary Balancing Criteria

- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, or volume of waste through treatment
- Short-term effectiveness
- Implementability
- Cost

Remedial Actions

### Notes:

The five primary balancing criteria are used to identify major trade-offs between the alternatives. These trade-offs are balanced to identify the preferred alternative.

**Long-term effectiveness and permanence** considers the magnitude of the risk and the alternative's ability to maintain reliable protection after cleanup is complete.

**Reduction of toxicity, mobility, or volume of waste through treatment** considers the following factors:

- Anticipated performance of technologies the alternative would use
- Amount of hazardous materials destroyed or treated
- Anticipated reductions in toxicity, mobility, and volume
- Type and quantity of substances remaining after treatment
- Reversibility of treatment

**Short-term effectiveness** addresses the following concerns:

- Protection of community and workers during remedial actions
- Environmental impacts the implementation of the alternative may incur
- Time needed to achieve remedial action objectives

**Implementability** is the technical and administrative feasibility of the alternative, including the following factors:

- Availability of materials and services needed to implement the alternative
- Reliability of technology the alternative would use
- Ability to monitor the alternative's progress and effectiveness

Another aspect of this assessment is the determination of the requirements for interaction with other federal, state, or local agencies, e.g., determining necessary permits for off-site actions.

**Cost** includes capital costs, operating and maintenance costs, and present worth costs. CERCLA requires that any remedy selected be cost-effective. This process should also consider costs of any long-term liability associated with implementing the remedy.

## Modifying Criteria

- State acceptance
- Community acceptance

*Remedial Actions*

### Notes:

The modifying criteria may not be considered fully until after the formal public comment period on the Proposed Plan and the RI/FS report is complete.

***State acceptance*** addresses the State's views of both federal and state ARARs. EPA's acceptance of the remedy should be addressed under this criterion.

***Community acceptance*** refers to the public's general response to the alternatives.

Example: ORR Lower East Fork Poplar Creek - cleanup levels for mercury-contaminated sediments were raised in response to community input.

## **Feasibility Study ARARs Support**

- Update/revise RI chemical- and location-specific ARARs
- Develop action-specific ARARs for all alternatives
- Identify whether each ARAR is *applicable* or *relevant and appropriate*
- Address and justify any ARAR waivers needed
- Negotiate any ARAR issues with regulators

*Remedial Actions*

**Notes:**

## The FS Report

- No specific format required by EPA
- FFA or IAG may specify format and/or information to be included
- Summarizes findings of detailed analysis of alternatives
- No selection yet of preferred alternative, but provides basis for remedy selection in the proposed plan and ROD

*Remedial Actions*

### Notes:

EPA lists a suggested FS Report format on Table 6-5 of its *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA /540/G-89/004, OSWER 9355.3-01, October 1988).

The findings of the detailed analysis of alternatives are summarized in the FS report. The RI report, the treatability studies report, and the FS report are then integrated into the final RI/FS report. This report becomes the basis for the selection of the remedial action for the site.

## ARARs Documentation in the FS Report

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- Integrate major ARARs for each alternative into description of alternatives in *Detailed Analysis* chapter
- Discuss each alternative's ability to comply with identified ARARs in comparative analysis section of *Detailed Analysis* chapter
- Discuss in this section, also, any needed waivers and their justification
- Include, in an appendix, text and tables summarizing all ARARs for all alternatives

*Remedial Actions*

**Notes:**

## Proposed Plan

- Purpose - selects preferred alternative & solicits public involvement & acceptance
- Format - fact sheet or brief report
- Outlines:
  - ⇒ Nature/extent of contamination
  - ⇒ Alternatives evaluated
  - ⇒ Preferred approach

*Remedial Actions*

### Notes:

The Proposed Plan, a document intended for a general audience, describes the remedial alternatives analyzed, identifies the preferred alternative, and discusses the rationale for its selection. It provides the public with an opportunity to examine and comment on remediation alternatives, including the preferred alternative, and participate in the remedy selection process as required under 40 CFR 300.430(f)(3).

## ARARs Documentation in Proposed Plan

- Integrate major ARARs for each alternative into alternatives description in *Summary of Alternatives*
- Discuss preferred alternative's ability to comply with identified ARARs in *Evaluation of Preferred Alternative*
- List here, also, any needed waivers & justification
- Include detailed listing of ARARs for preferred alternative, summary listing of ARARs for all alternatives
- State in Proposed Plan whether LDRs do or don't apply to preferred alternative

*Remedial Actions*

### Notes:

For further information, see EPA's *Guide to Developing Proposed Plans* (OSWER 9335.2-02FS-2, May 1990) and *Guidance on Preparing Superfund Decision Documents: The Proposed Plan, The Record of Decision, Explanation of Significant Differences, and The Record of Decision Amendment* (Interim Final, EPA/540/G-89/007, OSWER 9355.3-02, July 1989).

A listing of ARARs should always include a determination of whether the requirements are *applicable* or *relevant and appropriate*.

## **ARARs Support for Proposed Plan Stage**

- Negotiate and reach concurrence on ARARs before they are included in Proposed Plan or ROD
- Dispute resolution for unresolved issues

*Remedial Actions*

### **Notes:**

The formal dispute resolution process is usually documented in the FFA for each DOE site. The process usually involves elevating the dispute to increasingly higher administrative levels until resolution is achieved. For example, for the Oak Ridge Reservation, unresolved disputes are elevated to the Dispute Resolution Committee (i.e., the Director of EPA Region IV's Waste Management Division, the Administrator of the Tennessee Bureau of Environment, and the DOE Assistant Manager for Environmental Restoration and Waste Management, Oak Ridge Field Office), then to the Senior Executive Committee (i.e., the Administrator of EPA Region IV, the Commissioner of the Tennessee Department of Environment and Conservation, and the DOE Manager of Oak Ridge Operations). If the SEC cannot resolve the dispute, it is elevated to the Administrator of EPA who confers with the Secretary of the DOE and the Commissioner of TDEC before issuing a resolution of the dispute.

## Record of Decision

- Purpose - selects remedy and sets bounds for RD and RA
- Format - brief and highly structured
- ARARs *frozen* when ROD is signed
- Remedial action must start within 15 months of signed ROD

*Remedial Actions*

### Notes:

The ROD is a formal, legal mechanism for documenting the remedy selection process and the analyses and policy determinations that support selection of the final remedy.

For DOE facilities, remedy selection is a joint responsibility of DOE and EPA. If agreement on the remedy cannot be reached, and the dispute resolution process fails, under 40 CFR 300.435(f)(4), EPA has the authority to unilaterally select the remedy.

## Types of RODs

- No Action
- Interim Action
- Contingent Action
- Final Action

*Remedial Actions*

### Notes:

For further information, see EPA's *Guidance on Preparing Superfund Decision Documents: The Proposed Plan, The Record of Decision, Explanation of Significant Differences, and The Record of Decision Amendment* (Interim Final, EPA/540/G-89/007, OSWER 9355.3-02, July 1989).

## **Basic Elements of ROD**

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- *Declaration*
- *Decision Summary*
- *Responsiveness Summary*

*Remedial Actions*

**Notes:**

## **ROD Declaration**

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- Formal statement signed by EPA that identifies selected remedy
- Includes a *Statutory Determinations* section stating that the selected remedy complies with ARARs or states that a waiver is justified and is cost-effective

*Remedial Actions*

**Notes:**

## ***ROD Decision Summary***

- Presents overview of site problems, remedial alternatives, and analysis of alternatives
- Explains rationale for remedy selection
- *Statutory Determinations* section explains how selected remedy satisfies statutory requirements
  - ⇒ Lists major ARARs/TBCs
  - ⇒ Discusses compliance with ARARs
  - ⇒ Discusses any waivers & justification

*Remedial Actions*

### **Notes:**

For further discussion, see EPA's *A Guide to Developing Superfund Records of Decision* (OSWER 9335.3-02FS-1, November 1989).

Both the Declaration and the Decision Summary parts of a ROD have a *Statutory Determinations* section. The *Statutory Determinations* section in the Declaration merely states that the selected remedy complies with ARARs or lists any ARAR waiver needed and its justification. The *Statutory Determinations* section in the Decision Summary actually lists and discusses the major ARARs, distinguishes applicable from relevant and appropriate requirements, lists any TBCs and provides the rationale for using them, discusses whether and how the remedy will comply with ARARs, and states any waivers invoked and justifies them.

## **ROD Responsiveness Summary**

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- Provides decision-makers with information about community preferences
- Demonstrates to public how their comments were taken into account

*Remedial Actions*

**Notes:**

## **Remedial Design and Construction Phase**

---

- Purpose - develop remedial design/remedial action (RD/RA) Work Plan and implement remedial action
- Design/action *must* meet ARARs *as listed in signed ROD*
- Any documents produced should reference or re-list the ARARs in ROD

*Remedial Actions*

**Notes:**

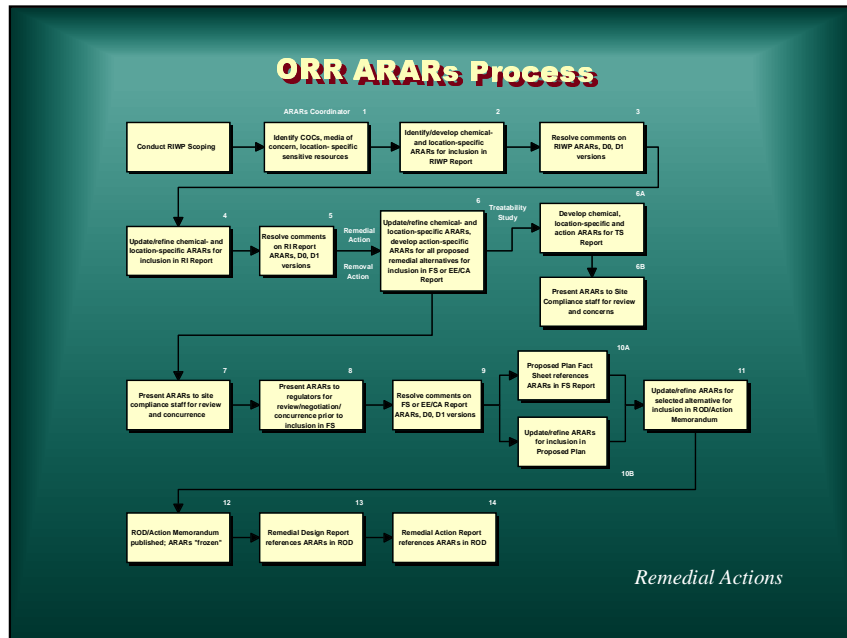
## **Remedial Design and Construction Phase**

- Identify additional ARARs based upon design specification/changes, if appropriate
- Verify protectiveness of remedy if significant new ARARs are promulgated or identified
- Review ARARs if remedial action is significantly different from ROD
- Any changes to preferred alternative and/or ARARs post-ROD must be specifically documented & approved by all stakeholders

*Remedial Actions*

### **Notes:**

EPA's *Guide to Addressing Pre-ROD and Post-ROD Changes* (OSWER Directive 9355.3-02FS-4, April 1991) outlines the methods for categorizing pre-and post-ROD changes and the ways in which changes should be documented.



## Notes:

This is a schematic example of how ARARs are identified, developed, revised, updated, refined, and negotiated for each step of the remedial process for CERCLA response actions at Oak Ridge Reservation.

## **Summary of ARARs Process**

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Development of ARARs is an iterative, negotiated process, beginning with a large realm of potential ARARs found in the RI Workplan, with revisions, additions, and deletions occurring as the remedial process progresses, until the ARARs are finalized as the ROD is signed

*Remedial Actions*

**Notes:**

## **Key Points to Remember**

- RI lists chemical- and location-specific ARARs
- FS updates these & adds action- specific ARARs
- Identification of ARARs is an iterative, negotiable process
- ARARs are “frozen” when ROD is signed
- Remedial actions must comply with all ARARs that are not waived

*Remedial Actions*

**Notes:**